VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a minor industrial facility permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of §9 VAC 25-260-00 et seq. The discharge results from the operation of a petroleum remediation corrective action. This permit action consists of establishing effluent limits for benzene, toluene, ethylbenzene, total xylenes, MTBE (methyl tert-butyl ether), pH, and total lead.

1. **Facility Name and Address:** SIC Code: 5541

Heptinstall Grocery
4184 Mentow Drive
Huddleston, VA 24104

Location: North side of the intersection of Route 626 and Route 628, ½ mile southeast of Mentow, Bedford County, VA

2. **Permit No. VA0091502** Existing Permit Expiration Date: July 20, 2009

3. **Owner Contact:** Mr. Matthew Stump
Title: Project Manager, ECS Mid-Atlantic, LLC.
Telephone No: (540) 362-2000

4. **Application Complete Date**:
Permit Drafted By: Lewis Pillis Date: February 4, 2009
DEQ Regional Office: Blue Ridge Regional Office - Roanoke
Reviewed By: Kip Foster Date: February 23, 2009
Public Comment Period Dates: From: April 1, 2009 To: May 1, 2009

5. **Receiving Stream Name**: Orrix Creek River Mile: 0.19
Basin: Roanoke River Subbasin: Roanoke River Section: 5a Class: IV
Special Standards: PWS

7-Day, 10-Year Low Flow: 0.027 MGD 1-Day, 10-Year High Flow: 0.023 MGD
7Q10 High Flow Months 0.092 MGD 1Q10 High Flow Months 0.079 MGD
30-Day, 5-Year Low Flow(30Q5): 0.052 MGD Harmonic Mean Flow: 0.14 MGD
30-Day, 10-Year Low Flow (30Q10): 0.087 MGD

Appendix B contains a copy of the flow frequency determination memorandum

Tidal: No 303(d) Listed: No

6. **Operator License Requirements**: None

7. **Reliability Class**: I

8. **Permit Characterization**:

(X)	Private	( )	PVOTW
( )	Federal	( )	Interim Limits in Other Document
( )	State	( )	Possible Interstate Effect
( )	POTW		

9. Discharge Description:

Outfall No.	Discharge Source	Treatment	Flow, MGD	
			Average	Maximum
001	Groundwater remediation from gasoline USTs PC1999-1228	DPE Air/water separation Stripperator [Oil/water separation, Aerator/stripper] Clay filter zeolite/clay filtration granular activated carbon	.00155*	

* Monthly average flow is not available and maximum monthly average flow reported on DMRs is believed to be total monthly flow. The Corrective Action Plan Implementation Report dated 10/10/2008, reports the total flow from July through September 2008, as 124,156 gallons. Assuming that the flow is consistent from day to day, the maximum monthly average flow during this time was from 8/5 - 9/2 was 46,565 or 1605 gpd. The total volume of ground water treated from 7/2005 to 9/2008 was reported as 1,175,646 gallons (about 1017 gpd).

This facility is a gasoline service station. Petroleum released from two underground storage tanks (USTs), removed from the site in 1998 and previous USTs dating back to the 1910s resulted in petroleum-impacted groundwater. The reported releases were from both leaded and unleaded gasoline USTs. The Corrective Action Plan (CAP) addresses cleanup of groundwater at the site.

The corrective action consists of the use of a Dual-Phase Extraction (DPE) system, utilizing a liquid ring pump, to extract groundwater, free phase petroleum and soil vapor from four shallow recovery wells. This pump operates at a rated air flow of 290 actual cubic feet per minute (ACFM) and a vacuum of 28" Hg. Contaminated ground water is also withdrawn from two bedrock recovery wells using submersible pumps. The entire system is designed to pump groundwater at a maximum of 10 gallons per minute or 0.014400 gpd. Following groundwater extraction from the recovery wells, recovered fluids are drawn into the knockout tank where settling of sand, silt and other material occurs and air is released to the atmosphere. Petroleum contaminated water flows into the treatment system. The treatment system's oil/water separator is rated for 10 gpm. Further details of the remediation system are provided in the CAP Reports. Please see **Appendix A** for a copy of the treatment schematic.

System alarms include the following:

- Air Stripper – High Water Level, Low Air Pressure
- Liquid Ring Pump – Temperature, High/Low Oil Level
- Oil/Water Separator – High Level
- Free Product Collection Tank – High Level
- Moisture Separator – High Level

10. **Sewage Sludge Use or Disposal**:

Not applicable.

11. **Discharge(s) Location Description**:

Name of Topo: Huddleston, VA
Topo Number : 077B
The latitude and longitude of the discharge is N 37°11'20.68'', E 79° 25'2.43".
(A location map is found in **Appendix A**)

12. **Material Storage**:

Free phase petroleum from the oil/water separator is stored in a 55 gallon drum outside the treatment building and is fitted with a high level alarm which will shut off the entire remediation system.

13. **Ambient Water Quality Information**:

The water body ID for this receiving stream is VAW-L27. Effluent from the treatment system has been piped the half mile to the perennial portion of Orrix Creek. The topographic map depicts Orrix Creek as an intermittent stream upstream of the discharge and as a perennial stream downstream. Orrix Creek then flows about 8.7 miles before entering the Big Otter River.

Orrix Creek is not listed as impaired, however, the Big Otter River (Lower) at the confluence of Orrix Creek is part of a TMDL listed segment due to high fecal coliform bacteria. The Big Otter segment's upstream end is the WQS designated public water supply (PWS), Sec. 5j, and the impairment extends downstream on the Big Otter River to the Buffalo Creek confluence. The Big Otter PWS intake is in Campbell Co., about 2.6 miles downstream of Orrix Creek, just below gaging station #02061500. The PWS is about 11.3 miles downstream of the discharge.

Chemical monitoring data from Orrix Creek consists of 2 samples collected from STORET station 4AORR002.63 in 2004. A maximum pH of 7.47 SU and a maximum temperature of 21.8C was reported from this station, which is downstream of the Route 713 Bridge in Bedford County. **Attachment B** presents the rest of the detectable STORET data.

14. **Antidegradation Review and Comments:** Tier I ___ Tier II **X** Tier III ___

The State Water Control Board's Water Quality Standards [WQSs] includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. Orrix Creek, in this segment (VAW-L27), is not listed on Part I of the 303(d) list for exceedance of water quality criteria and there is no data showing that the Water Quality Standards have been exceeded. Orrix Creek is determined to be a Tier II. As such, the resulting permit limitations are better than or equal to the water quality standards.

For purposes of aquatic life protection in Tier II waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. The antidegradation baseline for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where: "WQS" = Numeric criterion listed in 9 VAC 25-260-5 et seq. for the parameter analyzed
"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

These "antidegradation baselines" become the new water quality criteria in Tier II waters and effluent limits for future expansions or new facilities must be written to maintain the antidegradation baselines for each pollutants. Antidegradation baselines have been calculated as described above and included in **Attachment B**. Antidegradation baselines for protection of aquatic life and human health are applicable to Orrix Creek and were calculated and applied at permit issuance using flow frequencies for the perennial stream.

The current permit was written based on a discharge to the upgradient dry ditch. The discharge was relocated to the main stem of Orrix Creek. This information was not available when the permit was issued and is a "material and substantial alteration to the permitted facility" that allows increases in WQS-based limits (backsliding) by exception 1 of Section 402 (o)(2) of the Clean Water Act.

Water quality based effluent limits for benzene, toluene, ethylbenzene, total xylenes, MTBE, pH, and total recoverable lead have been established in compliance with antidegradation requirements set forth in 9 VAC 25-260-30 of the water quality standards regulations.

15. **Site Inspection**: Date: 2006 Performed by: Lewis Pillis

16. **Effluent Screening & Limitation Development**:

The following have been detected in the past three years in effluent from this facility:

Pollutant	maximum
Benzene	3.6 ug/L
Lead	52.8 ug/L
Methyl tertiary butyl ether [MTBE]	2572 ug/L
Toluene	2 ug/L
Xylenes, total	4.8 ug/L

DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq). See the table on the following page for a summary of the limitations.

The DEQ MIX.EXE program was run to determine the percentage of the perennial receiving stream flow that could be used in the wasteload allocation [WLA] calculations. The program output indicated that 100 % of the 7Q10 and 36.19% of 1Q10 may be used for calculating acute and chronic WLAs for the perennial portion of Orrix Creek. A copy of the printout from MIX.EXE is included in **Appendix C**.

The standard DEQ spreadsheet was developed for all WQS pollutants and limits calculated using the STATS.exe program where effluent data exists in the same chemical form as that of the water quality standard. The more stringent of the resulting WLAs or aWLAs [antidegradation WLAs] were selected to be used in the STATS program. Since pollutants are currently being removed by the remediation system, values from groundwater are used to determine limits rather than effluent data. This is necessary since the lower effluent data would be interpreted by the computer program as clean water and no limit would be required. **Appendix C** contains the spreadsheet used to calculate the stream standards, wasteload allocations and the reasonable potential determination (results of the STATS program) for each parameter.

Final Limitations

Date: From effective date of permit
To expiration date

Outfall 001
SIC Code 5541

Parameter	Basis for Limit	Discharge Limitations				Monitoring Requirements	
		Monthly Average	Max Weekly Average	Min	Max	Frequency	Sample Type
Flow (MGD)	3	NL	NA	NA	NL	1/Month	Estimated
pH (S.U.)	2	NA	NA	6.0	9.0	1/Month	Grab
Benzene	1	NA	NA	NA	50 ug/L	1/Month	Grab
Toluene	2	NA	NA	NA	1100 ug/L	1/Month	Grab
Ethylbenzene	2	NA	NA	NA	2000 ug/L	1/Month	Grab
Total Xylenes	2	NA	NA	NA	220 ug/L	1/Month	Grab
MTBE	2	NA	NA	NA	50 ug/L	1/Month	Grab
Total Recoverable Lead	2	NA	NA	NA	15 ug/L	1/Month	Grab

NL = no limit; NA = not applicable

The basis for the limitations codes are:
1. Technology –based limits from the General VPDES Permit for Discharges from Petroleum Contaminated Sites and Hydrostatic Tests, 9VAC25-120 et. seq
2. Water Quality-based limits
3. Best Professional Judgment (BPJ)-based limits

pH

Limitations for pH are set according to the *Water Quality Standards (9 VAC 25-260-00 et. seq*. The limits are a daily minimum 6.0 Standard Unit (S.U.) and a daily maximum 9.0 S.U., with monitoring once per month.

Petroleum Organics

The basis for these limits is the same as that cited in the General VPDES Permit for Discharges from Petroleum Contaminated Sites and Hydrostatic Tests, 9VAC25-120 et. seq. [General Permit] for discharges to public water supplies [PWSs], with the exception that water quality standard-based limits will be higher than those in the General Permit due to dilution with the flow in the receiving stream. Technology-based concentration limits developed in the General Permit are compared to the WQS-based limits. Antidegradation is applied, as it was in the permit issuance and lowest WLA, AWLA or technology based limit is used to develop the permit limit.

Summary of basis for permit limits, all units are micrograms/liter

	Human Health criteria	Human Health WLA	Human Health AWLA	GP limit for taste & odor	WLA for taste & odor	GP Acute Criteria	Acute WLA	Acute AWLA	GP Chronic Criteria	Chronic WLA	Chronic AWLA	Technology-based limit
Benzene	12	1100	110			530	2400	2000	53	950	237	50
Toluene	6800	230000	23000			1750	8000	6700	175	3100	780	
Ethylbenzene	3100	100000	10000			3200	15000	13000	320	5720	1400	
Xylenes						330	1500	1300	33	590	150	
MTBE				15	500	18400	84000	71000	1840	33000	8300	2500
EDB	0.169	15	1.5			1500	6800	5700	150	2700	680	
1,2 DCA	3.8	130	13			11800	54000	45000	1180	21000	5300	

The DEQ STATS program is used for establishing a reasonable potential water quality based limit. Limits are forced by using pollutant concentrations in groundwater without treatment. These concentrations were taken from the October 2008, CAPIMP Report, a copy of page from which these were taken is included in Appendix C. Where daily maximum and monthly average limitations would be the same, only daily maximum limits are used, since the average limit would be met if the maximum is met. Printouts from the STATS program are also found in Appendix C.

Benzene
The criteria of 12 ug/L is the most stringent, as is stated in the fact sheet of the current permit. With the additional dilution available from relocating the outfall, the WLA of 110 µg/l is higher than the technology-based concentration of 50 µg/l and limits are set at a daily maximum of 50 µg/l. DMR data from the past three years shows that this limit has been consistently met. Monitoring frequency remains once per month.

Toluene
The most stringent basis is the chronic antidegradation WLA [AWLAc]. Reasonable potential determination establishes a daily maximum limit equal to 1100 ug/L. Monitoring frequency is once per month since toluene has not been detected above the QL of 10 ug/L in the past three years.

Ethylbenzene
The most stringent limitation is also based on the AWLAc. Reasonable potential determination establishes a daily maximum limit of 2000 ug/L. Monitoring frequency is once per month since ethylbenzene has not been detected above the QL of 10 ug/L in the past three years.

Xylenes
The most stringent limitation is based on the AWLAc. Reasonable potential determination establishes the daily maximum limit equal to 220 ug/L. Monitoring frequency is once per month since total xylenes have not been detected above the QL of 10 ug/L in the past three years.

MTBE (methyl tert-butyl ether)
Virginia Water Quality Standards do not address MTBE . However, the Virginia Department of Health has lowered the advisory level for MTBE to 15 ug/l in public water supplies. Applying this as a human health WQS, the AWLA is the most stringent, which is 10% of the WLA, at 50 ug/L. Derivation of this uses the 30Q5 flow since MTBE is not a carcinogen. According to Agency guidance [GM 2000-2011], this is applied as the limit, since it is lower than the STATS-derived limit based on aquatic toxicity.

There were problems meeting the MTBE in 2006. Additional carbon treatment was added and the effluent limit has been met for the past 27 of 28 months and has not been detected in the past year. Monitoring will continue at once a month.

Ethylene Dibromide (EDB)
There is no data showing that EDB is present in ground water at this site. DEQ Alternate Water Supply [AWS] program tested the Heptinstall drinking water supply well in the past year for EDB. EDB was not found in four samples in 2007-8, in untreated water at a detection level of 0.02 ug/L. The human health AWLA is the most stringent EDB WQS at 1.5 ug/L. EDB is not expected to be present in the influent at concentrations near the WQS. Due to this, a permit limit for EDB is not added to the permit.

1,2-Dichloroethane (1,2 DCA)

The human health AWLA is the most stringent WQS at 13 ug/L. This pollutant was marked 'believed absent" on the permit application. DEQ AWS testing on the Heptinstall drinking water supply well in the past two years shows low levels below 5 ug/L. Due to this, this pollutant is not expected to be present in the influent at concentrations near the WQS and a permit limit is not added to the permit.

Total Recoverable Lead
Since lead is currently being removed by the remediation system, a lead value from groundwater [MW5, 9/16/2008] of 142 ug/l was used in the STATs program to determine the permit limit. The resulting permit limit is a daily maximum of 15 ug/L. Three times, over the past three years, the lead concentration in the effluent has exceeded this number. However, after a zeolite filter was added to the remediation system, lead in the effluent has been lower than the proposed limit. Therefore, monitoring frequency remains once per month.

17. **Antibacksliding Statement**:

Permit limits for benzene, ethylbenzene, toluene, xylenes, MTBE and lead are increased from those in the current permit. The current permit was written based on discharge to a dry ditch. The discharge was relocated to the perennial portion of Orrix Creek. This information was not available when the permit was issued and is a "material and substantial alteration to the permitted facility" that allows increases in WQS-based limits (backsliding) by exception 1 of Section 402 (o)(2) of the Clean Water Act.

18. **Compliance Schedules**:

There are no compliance schedules in the reissued permit.

19. **Special Conditions:**

a. **Quantification Levels and Compliance Reporting under Part I.A (Part I.B.1)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR Part 130, Water Quality Planning and Management, Subpart 130.4. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

b. **Notification Levels (Special Condition I.B.2.)**

Rationale: Required by *VPDES Permit Regulation*, 9 VAC 25-31-200.A. for all manufacturing, commercial, mining, and silvicultural discharges.

c. **Materials Handling/Storage (Special Condition I.B.3.)**

Rationale: 9 VAC 25-31-50.A.1. prohibits the discharge of any wastes into the State waters unless authorized by the permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

d. **O&M Manual Requirement (Special Condition I.B.4.)**

Rationale: Required by Code of Virginia §62.1-44.16; *VPDES Permit Regulation* 9 VAC 25-31-190.E, and §40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O & M Manual ensures this.

e. **Total Maximum Daily Load (TMDL) Reopener (Special Condition I.B.5.)**

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

f. **Part II, Condition Applicable to All Permits**

Rationale: *VPDES Permit Regulation*, 9 VAC 25-31-190 requires all VPDES permit to contain or specifically cite the conditions listed.

19. **NPDES Permit Rating Worksheet:** Total Score 15

Please see **Appendix A** for a copy of the NPDES Permit Rating Worksheet.

20. **Changes to Permit**:

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	all organics	NC		NL kg/d	NA kg/d	Loading limits not needed	
	Benzene, ug/L	NC		12	50	Technology limit more restrictive for new outfall location	2/5/9
	Toluene, ug/L	NC		175	1100	Effluent relocated to perennial stream	2/5/9
	Ethylbenzene, ug/L	NC		320	2000	Effluent relocated to perennial stream	2/5/9
	Total Xylenes, ug/L	NC		74	220	Effluent relocated to perennial stream	2/5/9
	MTBE, ug/L	NC		20	50	Effluent relocated to perennial stream	2/5/9
	T. R. Lead, ug/L	NC		3.9	15	Effluent relocated to perennial stream	2/5/9

NC = not changed

Changes to special conditions:

1. Compliance Reporting under Part I.A. (Part I.B.) wording added for reporting significant figures.
2. Corrective Action Plan and Operation Schedule deleted(Special Condition I.B.), CAP has been approved and the remediation system is in operation
3. Water Quality Criteria Reopener (Special Condition I.B.6) removed
4. Water Quality Criteria Monitoring (Special Condition I.B.7) removed.

21. **Variances/Alternate Limits or Conditions:**

There are no variances/alternate limits in this permit. A waiver to application testing requirements was granted so that test results for BOD, COD, TOC, TSS and ammonia was not required. These pollutants are not expected to be present in significant concentrations.

22. **Public Notice Information:**

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Lewis Pillis at:

Virginia DEQ
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6789
ljpillis@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit issuance within 30 calendar days from the date of the first notice, and may request a public hearing during this comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the Board will make a determination regarding the proposed reissuance. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

Persons may comment in writing or by email to the DEQ on the proposed reissuance of the permit within 30 days from the date of the first notice. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The Director of the DEQ may decide to hold a public hearing if public response is significant.

23. 303(d) Listed Segments (TMDL):

The 2008 Water Quality Assessment and Impaired Waters Report 305(b)/303(d)does not list Orrix Creek as impaired.

24. **Additional Comments:**

Previous Board Action: The permitted owner for the permit issued on July 21, 2004, was Jim Oyler, ECS Limited. ECS Mid-Atlantic, LLC. will become the owner upon reissuance.

Staff Comments: The VDH commented that the discharge was 11 miles upstream of a PWS and recommended that adequate reliability provisions for the treatment system be provided to prevent exceedances of the PWS WQSs. Operation of this groundwater remediation is overseen by DEQ, BRRO-Roanoke. Alarms present on the remediation treatment system are listed on page 3 of this fact sheet.

Public Comment: The discharge is not controversial. No comments were received during the public notice period.

List of Appendices:

Appendix A – NPDES Permit Rating Worksheet, USGS Map, Flow Diagram, Effluent Data
Appendix B – Receiving Stream Data, Flow Frequency Memorandum
Appendix C – Effluent Limit Development, waste load allocations, STATS printouts

APPENDIX A

NPDES Permit Rating Worksheet
Site/Flow Diagram
USGS Map
Effluent Data

NPDES PERMIT RATING WORK SHEET

NPDES NO. VA0091502

☐ Regular Addition
☐ DiscretionaryAddition
X Score change, but no status change
☐ Deletion

Facility Name: Heptinstall Grocery (Remediation c/o ECS Mid-Atlantic, LLC)

City: Mentow Bedford County

Receiving Water: Orrix Creek

Reach Number:

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?
1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate
☐ YES; score is 600 (stop here) X NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

☐ YES; score is 700 (stop here)
X NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: 5541 Primary SIC Code: 4959 Other SIC Codes: 8999
Industrial Subcategory Code: 000 (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	15	☐ 7.	7	35
x 1.	1	5	☐ 4.	4	20	☐ 8.	8	40
☐ 2.	2	10	☐ 5.	5	25	☐ 9.	9	45
			☐ 6.	6	30	☐ 10.	10	50

Code Number Checked: 1

Total Points Factor 1: 5

FACTOR 2: Flow/Stream Flow Volume (*Complete either Section A or Section B; check only one)*

Section A ☐ Wastewater Flow Only Considered

Wastewater Type (See Instructions)		Code	Points
Type I: Flow < 5 MGD	☐	11	0
Flow 5 to 10 MGD	☐	12	10
Flow > 10 to 50 MGD	☐	13	20
Flow > 50 MGD	☐	14	30
Type II: Flow < 1 MGD	☐	21	10
Flow 1 to 5 MGD	☐	22	20
Flow > 5 to 10 MGD	☐	23	30
Flow > 10 MGD	☐	24	50
Type III: Flow < 1 MGD	☐	31	0
Flow 1 to 5 MGD	☐	32	10
Flow > 5 to 10 MGD	☐	33	20
Flow > 10 MGD	☐	34	30

Section B ☐ **Wastewater and Stream Flow Considered**

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10 %	☐	41	0
	10 % to < 50 %	☐	42	10
	> 50 %	☐	43	20
Type II:	**< 10 %**	**x**	**51**	**0**
	10 % to <50 %	☐	52	20
	> 50 %	☐	53	30

Code Checked from Section A or B: 51
Total Points Factor 2: 0

FACTOR 3: Conventional Pollutants NPDES NO: VA0091502
(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) ☐ BOD ☐ COD ☐ Other: NA

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: ____

Points Scored: ____

B. Total Suspended Solids (TSS) NA

			Code	*Points*
Permit Limits: (check one)	☐	< 100 lbs/day	1	0
	☐	100 to 1000 lbs/day	2	5
	☐	> 1000 to 5000 lbs/day	3	15
	☐	> 5000 lbs/day	4	20

Code Checked: ____

Points Scored: ____

C. Nitrogen Pollutant: (check one) ☐ Ammonia ☐ Other: NA

		Nitrogen Equivalent	*Code*	*Points*
Permit Limits: (check one)	☐	< 300 lbs/day	1	0
	☐	300 to 1000 lbs/day	2	5
	☐	> 1000 to 3000 lbs/day	3	15
	☐	> 3000 lbs/day	4	20

Code Checked: ____

Points Scored: ____

Total Points Factor 3: 0

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

X YES (If yes, check toxicity potential number below)

☐ NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ☐ check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
☐ No process waste streams	0	0	☐ 3.	3	0	☐ 7.	7	15
X 1.	1	0	☐ 4.	4	0	☐ 8.	8	20
☐ 2.	2	0	☐ 5.	5	5	☐ 9.	9	25
			☐ 6.	6	10	☐ 10.	10	30

Code Number Checked: 1

Total Points Factor 4: 0

FACTOR 5: Water Quality Factors NPDES NO. VA0091502

A. *Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:*

		Code	Points
X	Yes	1	10
☐	No	2	0

B. *Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?*

		Code	Points
X	Yes	1	0
☐	No	2	5

C. *Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?*

		Code	Points
☐	Yes	1	10
X	No	2	0

Code Number Checked: A 1 B 1 C 2

Points Factor 5: A 10 + B 0 + C 0 = 10 **TOTAL**

FACTOR 6: Proximity to Near Coastal Waters

A. *Base Score: Enter flow code here (from Factor 2):* 51 *Enter the multiplication factor that corresponds to the flow code:* 0.00

Check appropriate facility HPRI Code (from PCS):

	HPRI#	*Code*	*HPRI Score*
☐	1	1	20
☐	2	2	0
☐	3	3	30
X	4	4	0
☐	5	5	20

HPRI code checked: 4

Flow Code	*Multiplication Factor*
11, 31, or 41	0.00
12, 32, or 42	0.05
13, 33, or 43	0.10
14 or 34	0.15
21 or 51	0.10
22 or 52	0.30
23 or 53	0.60
24	1.00

Base Score: (HPRI Score) 0 X (Multiplication Factor) 0.3 = 0 (TOTAL POINTS)

B. *Additional Points ☐ NEP Program*
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

	Code	Points
☐ Yes	1	10
☐ No	2	0

C. *Additional Points ☐ Great Lakes Area of Concern*
For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)

	Code	Points
☐ Yes	1	10
☐ No	2	0

Code Number Checked: A __ B __ C __ NA

Points Factor 6: A __ + B __ + C __ = 0 TOTAL

SCORE SUMMARY NPDES NO. VA0091502

Factor	Description	Total Points
1	Toxic Pollutant Potential	5
2	Flows/Streamflow Volume	0
3	Conventional Pollutants	0
4	Public Health Impacts	0
5	Water Quality Factors	10
6	Proximity to Near Coastal Waters	0
	TOTAL (Factors 1 through 6)	15

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) X No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

X No

☐ Yes (Add 500 points to the above score and provide reason below:)

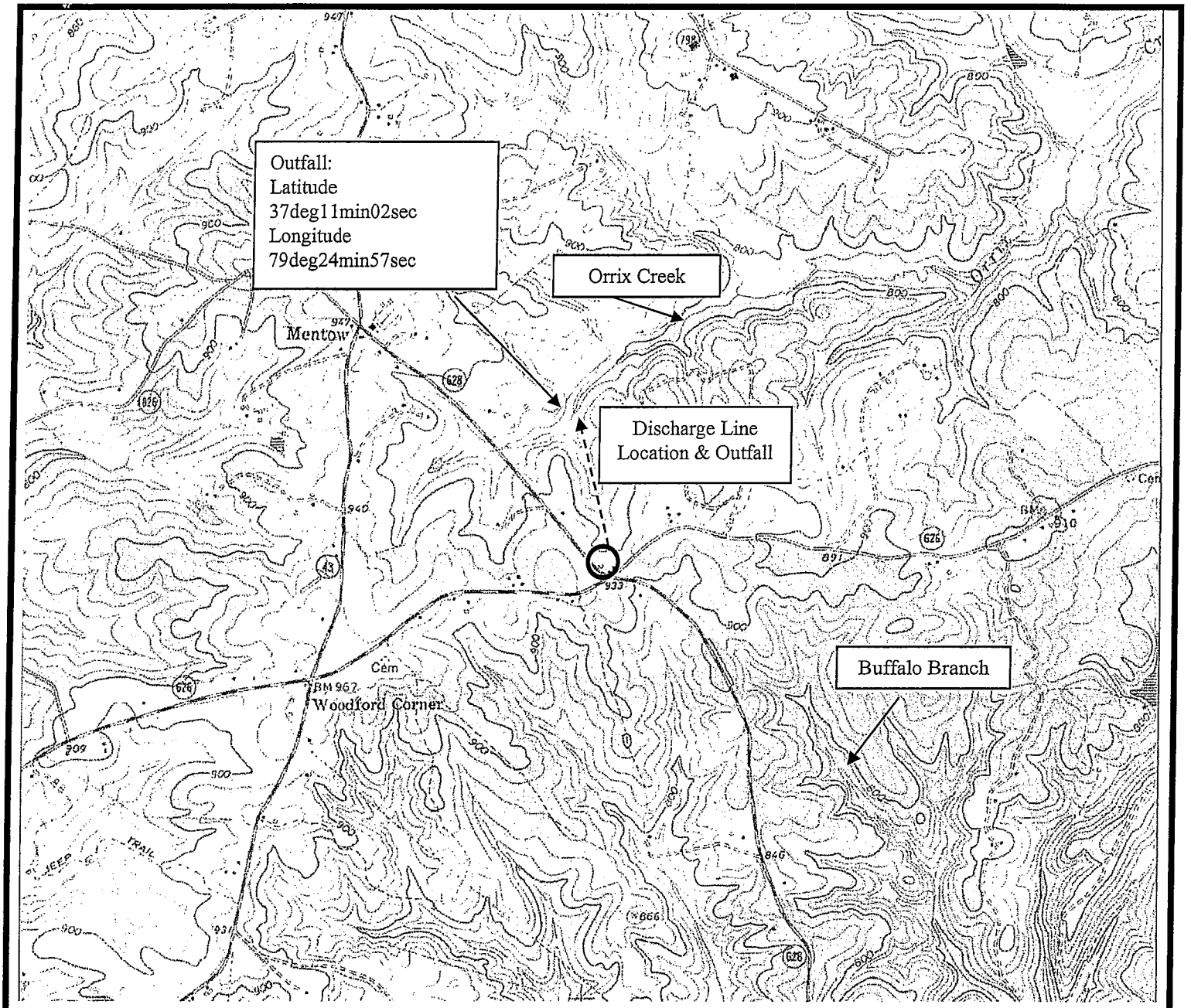
Reason:

NEW SCORE: 15
OLD SCORE: 70

Lewis J. Pillis
Permit Reviewer's Name

(540) 562-6789
Phone Number

02/05/2009
Date



LEGEND

N
W E
S

○ - Approximate Site Location

SCALE (IN FEET)

1000 2000

2000 0

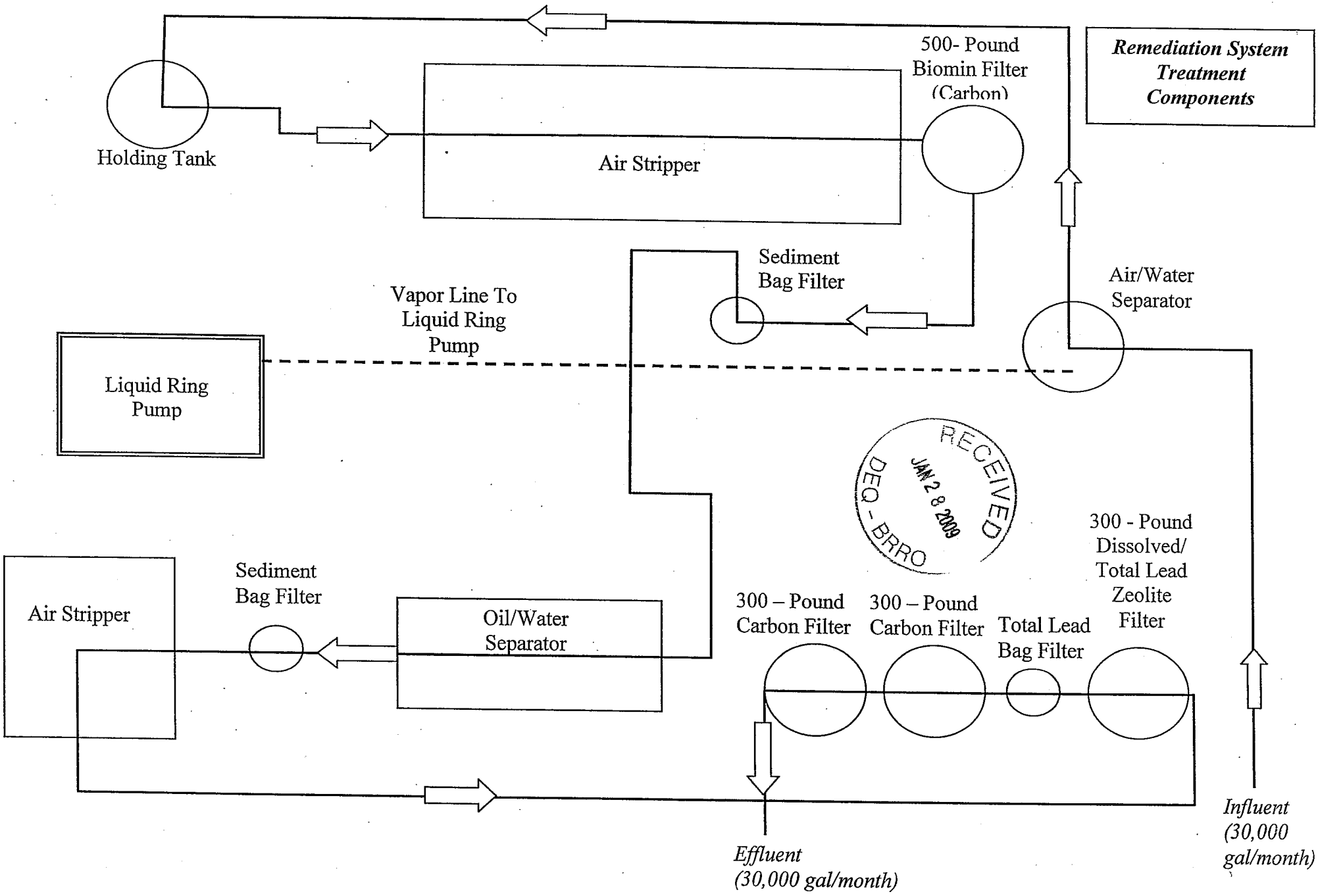
SOURCE:

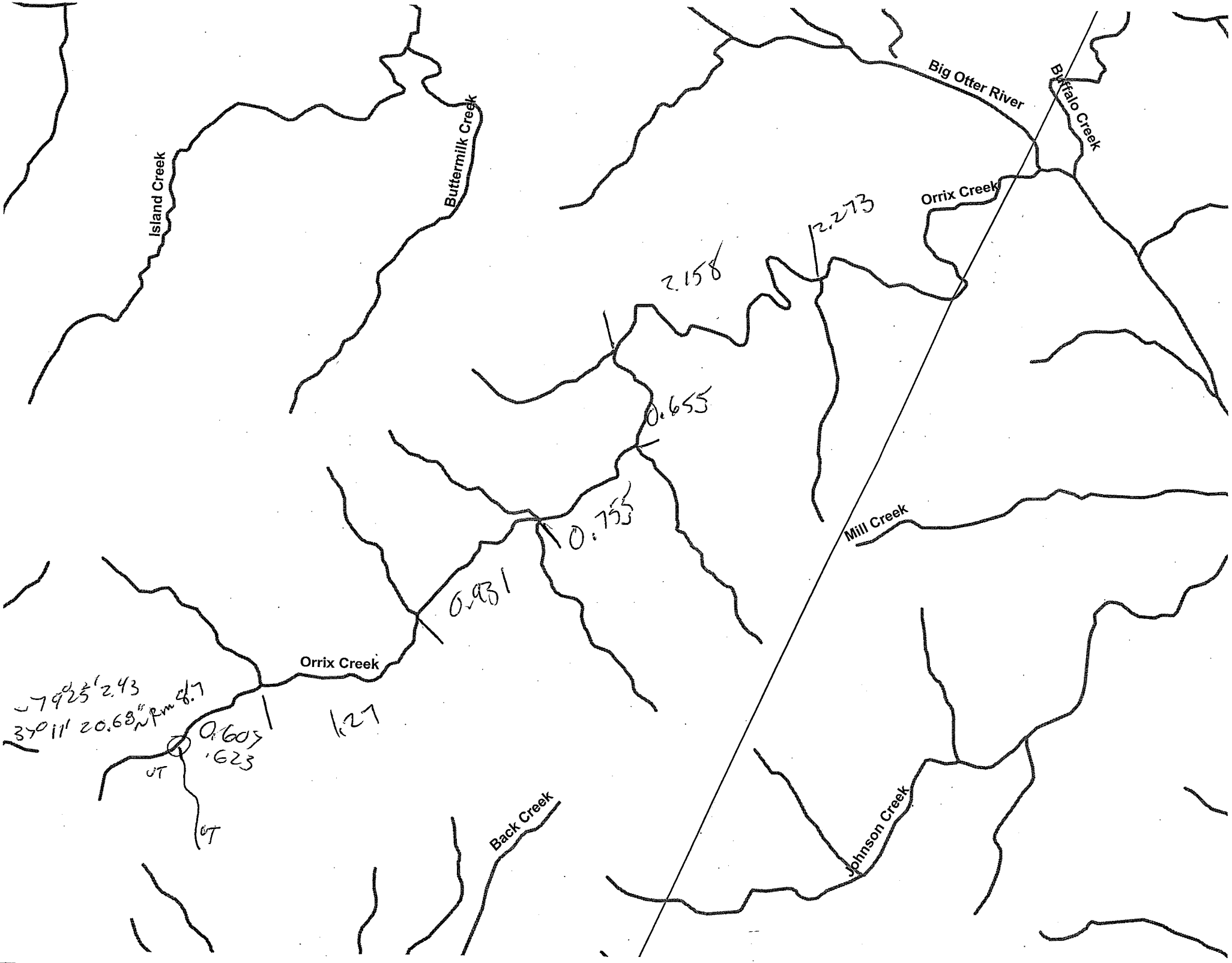
U.S.G.S. 7.5 MINUTE SERIES
HUDDLESTON QUADRANGLE,
VIRGINIA
DATED 1966, PHOTOREVISED 1985

ECS LLC
MID-ATLANTIC

SITE LOCATION & DISCHARGE MAP
HEPTINSTALL'S GROCERY
HUDDLESTON, VIRGINIA

ECS PROJECT NO. 2363-N


Remediation System Treatment Components
500- Pound Biomin Filter (Carbon)
Holding Tank
Air Stripper
Sediment Bag Filter
Air/Water Separator
Vapor Line To Liquid Ring Pump
Liquid Ring Pump
RECEIVED
JAN 2 8 2009
DEQ - BRRO
300 - Pound Dissolved/ Total Lead Zeolite Filter
Sediment Bag Filter
Air Stripper
Oil/Water Separator
300 – Pound Carbon Filter
300 – Pound Carbon Filter
Total Lead Bag Filter
Influent (30,000 gal/month)
Effluent (30,000 gal/month)


Island Creek
Buttermilk Creek
Big Otter River
Buffalo Creek
Orrix Creek
2.273
2.158
0.655
0.755
0.931
Mill Creek
Orrix Creek
-79°25'2.43
37°11'20.68"N Rm 8.7
0.607
.623
1.27
UT
UT
Back Creek
Johnson Creek

Heptinstall Grocery Permit No: VA0091502

DMR data

		LEAD, TOTAL RECOVERABLE ug/L	METHYL-TERT-BUTYL ETHER ug/L	BENZENE (AS C6H6) ug/L	TOLUENE (AS C7H8)	ETHYLBENZENE	TOTAL XYLENES
permit limit ==>		**3.9**	**20**	**12**	**175**	**320**	**74**
2006	1	27	<QL	<QL	<QL	<QL	<QL
	2	1.3	68.5	<QL	<QL	<QL	<QL
	3	NULL	NULL	NULL	NULL	NULL	NULL
	4	<QL	317	1.8	1.0	<QL	2.4
	5	NULL	NULL	NULL	NULL	NULL	NULL
	6	<QL	**2572**	<QL	<QL	<QL	<QL
	7	<QL	5.9	<QL	<QL	<QL	<QL
	8	9.6	3.7	<QL	<QL	<QL	<QL
	9	3.5	<QL	<QL	<QL	<QL	<QL
	10	3	6.1	<QL	<QL	<QL	<QL
	11	8.9	3.9	<QL	<QL	<QL	<QL
	12	<QL	<QL	<QL	<QL	<QL	<QL
2007	1	<QL	<QL	<QL	<QL	<QL	<QL
	2	<QL	<QL	<QL	<QL	<QL	<QL
	3	<QL	<QL	<QL	<QL	<QL	<QL
	4	<QL	11.5	<QL	<QL	<QL	<QL
	5	1.7	2.7	<QL	<QL	<QL	<QL
	6	0.7	20	<QL	<QL	<QL	<QL
	7	1.8	<QL	<QL	<QL	<QL	<QL
	8	5.8	<QL	<QL	<QL	<QL	<QL
	9	**52.8**	<QL	<QL	<QL	<QL	<QL
	10	1.3	3.1	<QL	<QL	<QL	<QL
	11	0.6	79.5	<QL	<QL	<QL	<QL
	12	NULL	NULL	NULL	NULL	NULL	NULL
2008	1	2.7	<QL	<QL	<QL	<QL	<QL
	2	0.3	<QL	<QL	<QL	<QL	<QL
	3	1	<QL	<QL	<QL	<QL	<QL
	4	2.1	<QL	<QL	<QL	<QL	<QL
	5	0.4	<QL	<QL	<QL	<QL	<QL
	6	1.1	<QL	<QL	<QL	<QL	<QL
	7	0.4	<QL	<QL	<QL	<QL	<QL
	8	1.8	<QL	<QL	<QL	<QL	<QL
	9	3.5	<QL	1.0	<QL	<QL	<QL
	10	2	<QL	<QL	<QL	<QL	<QL
	11						
	12						

September 22, 2008: While on-site sampling the Hogan supply well, ECS checked all recovery wells for leaks and proper stinger tube lengths. Recovery wells were adjusted slightly (between one to two feet into ground water); however, well MW-13 appeared to have a significant amount of sediment in the bottom of the well. Subsequent to adjusting stinger tubes, the individual vacuum line readings did not change significantly potentially signifying a different cause for the lower vacuums. The decreased vacuums will continue to be addressed.

September 26, 2008: ECS received telemetry notice indicating multiple alarms were activated due to a storm causing power issues. ECS restarted the system and performed routine O&M duties. Several system treatment cycles were observed while on-site. In approximately one (1) month since the hydro-fracturing event, MW-27 has recovered approximately three (3) to four (4) times the ground water as recovery well MW-26 in the following the hydro-fracturing event. The system was operational upon departure.

5.0 SYSTEM DISCHARGE MONITORING

ECS performed monitoring of the system's liquid-phase and vapor-phase discharge points during the period of operation. Details of the system discharge data for this period of operation are presented in the following sections. Discharge Monitoring Reports (DMRs) were submitted to the VDEQ by the 10th day of each month detailing BTEX, MTBE, total recoverable lead (TRL) concentrations, flow rate and field pH readings for system operations at Heptinstall's Grocery. During this period of operation, ECS has been in compliance with the discharge permit limits for the site.

5.1 Liquid-Phase Discharge Monitoring

A total of 124,156 gallons of groundwater was treated during the current period (July through September 2008) of system operation. A cumulative total of 1,175,646 gallons of groundwater have been treated since commencement of remediation activities at the site in July 2005. ECS collected monthly influent ground-water samples and post-treatment liquid effluent samples from a sampling port located after the GAC treatment units and prior to final discharge from the remediation system. The system liquid influent and effluent samples were submitted to REIC Laboratories in Beaver, West Virginia for analysis of BTEX and MTBE by Method 8021B, total petroleum hydrocarbons-gasoline range organics (TPH-GRO) by Method 8015B, and TRL. Sample chain-of-custody documentation was maintained during all phases of transport. A summary of system influent and effluent analytical data is presented in Table 6. The laboratory data sheets and chain-of-custody are presented in Appendix III.

Flow

REI Consultants, Inc. Analytical Results

Date: *24-Sep-08*

CLIENT:	ECS - MID-ATLANTIC LLC	WorkOrder:	0809C06
Client Sample ID:	MW13	Lab ID:	0809C06-06A
Project:	HEPTINSTALLS	Collection Date:	9/16/2008 3:18:00 PM
Site ID:	2363-L	Matrix:	GROUNDWATER

Analyses	Result	Units	Qual	MDL	PQL	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			SW8021B			Analyst: AS
Methyl tert-butyl ether	6,980	µg/L		26.0	250	9/24/2008 11:27:52 AM
Benzene	2,310	µg/L		12.5	50.0	9/24/2008 11:27:52 AM
Toluene	2,100	µg/L		20.5	50.0	9/24/2008 11:27:52 AM
Ethylbenzene	688	µg/L		15.5	50.0	9/24/2008 11:27:52 AM
m,p-Xylene	3,000	µg/L		24.5	100	9/24/2008 11:27:52 AM
o-Xylene	1,440	µg/L		19.5	50.0	9/24/2008 11:27:52 AM
Surr: 1,1,1-Trifluorotoluene	95.4	%REC			61-135	9/24/2008 11:27:52 AM

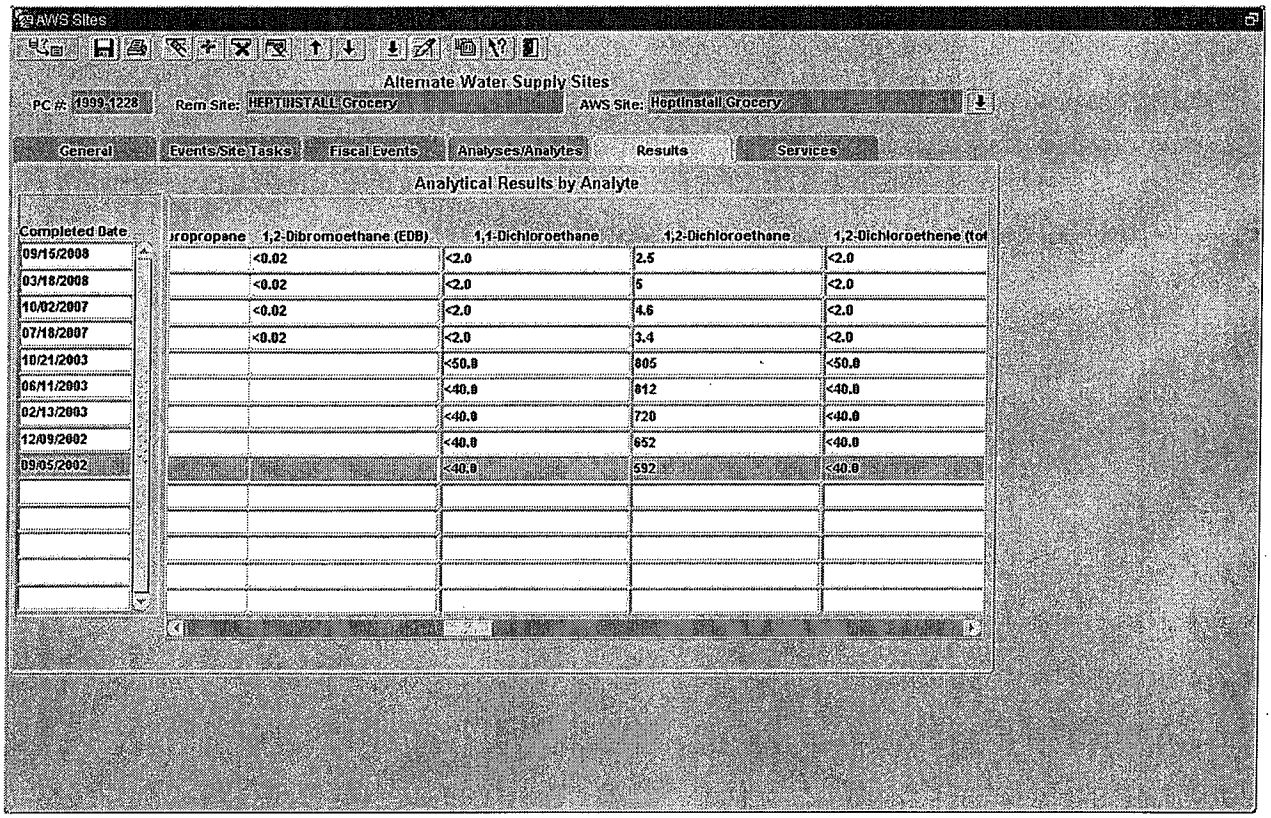
Key:			
MCL	Maximum Contaminant Level	J	Analyte detected below quantitation limits
MDL	Minimum Detection Limit	B	Analyte detected in the associated Method Blank
NA	Not Applicable	E	Estimated Value above quantitation range
ND	Not Detected at the PQL or MDL	H	Holding times for preparation or analysis exceeded
PQL	Practical Quantitation Limit	S	Spike/Surrogate Recovery outside accepted recovery limi
TIC	Tentatively Identified Compound, Estimated Concentrati	*	Value exceeds Maximum Contaminant Level

REI Consultants, Inc. **Analytical Results** **Date:** *24-Sep-08*

CLIENT:	ECS - MID-ATLANTIC LLC	**WorkOrder:**	0809C06
Client Sample ID:	MW5	**Lab ID:**	0809C06-03A
Project:	HEPTINSTALLS	**Collection Date:**	9/16/2008 4:00:00 PM
Site ID:	2363-L	**Matrix:**	GROUNDWATER

Analyses	Result	Units	Qual	MDL	PQL	Date Analyzed
METALS BY ICP-MS			**E200.8**			Analyst: **DL**
Lead	0.142	mg/L		0.00020	0.0010	9/18/2008 6:40:50 PM

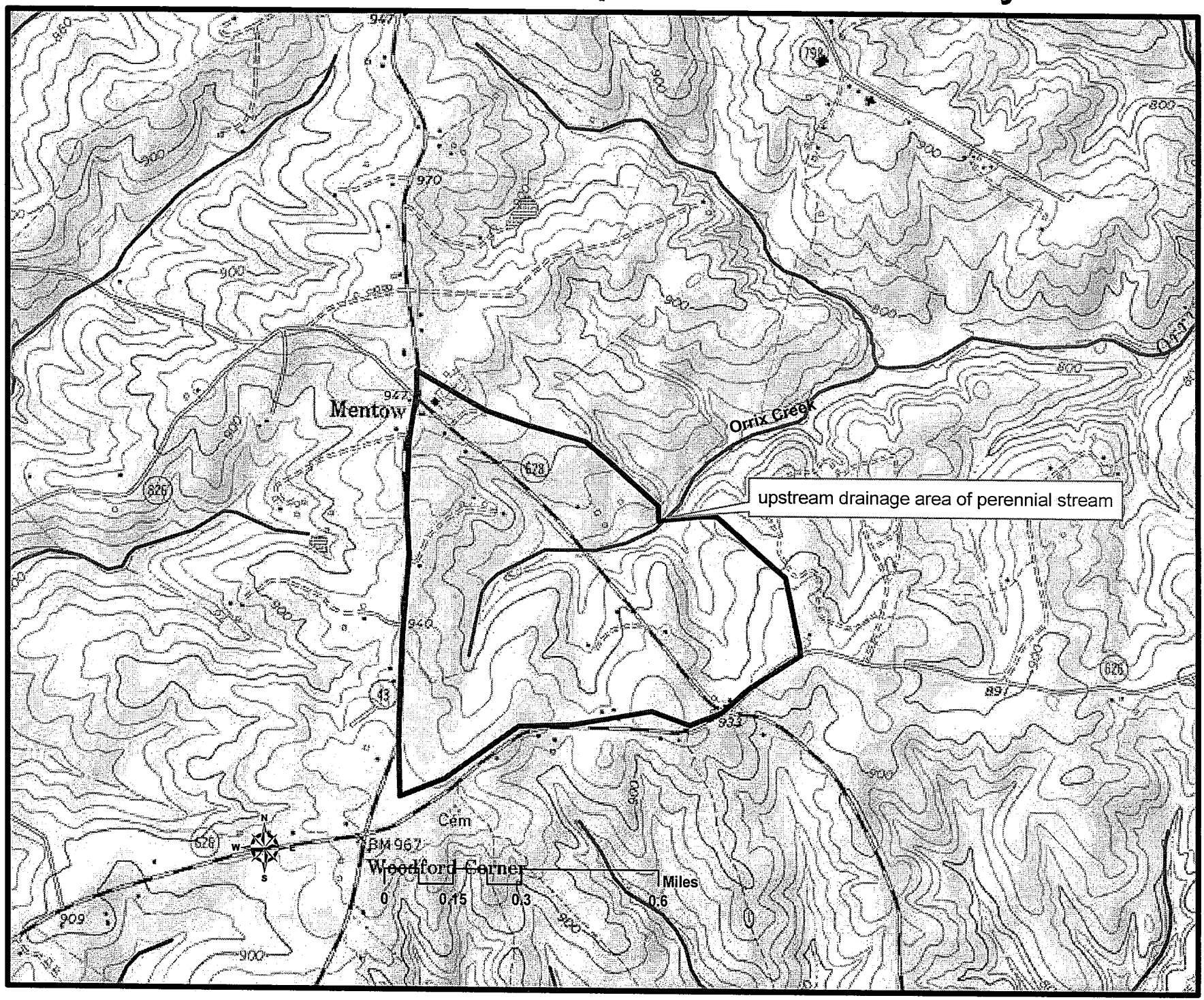
Key:	MCL	Maximum Contaminant Level	J	Analyte detected below quantitation limits
	MDL	Minimum Detection Limit	B	Analyte detected in the associated Method Blank
	NA	Not Applicable	E	Estimated Value above quantitation range
	ND	Not Detected at the PQL or MDL	H	Holding times for preparation or analysis exceeded
	PQL	Practical Quantitation Limit	S	Spike/Surrogate Recovery outside accepted recovery limi
	TIC	Tentatively Identified Compound, Estimated Concentrati	*	Value exceeds Maximum Contaminant Level


AWS Sites
Alternate Water Supply Sites
PC #: 1999.1228
Rem Site: HEPTINSTALL Grocery
AWS Site: HeptInstall Grocery
General
Events/Site Tasks
Fiscal Events
Analyses/Analytes
Results
Services
Analytical Results by Analyte
Completed Date
09/15/2008
03/18/2008
10/02/2007
07/18/2007
10/21/2003
06/11/2003
02/13/2003
12/09/2002
09/05/2002
ıropropane
1,2-Dibromoethane (EDB)
1,1-Dichloroethane
1,2-Dichloroethane
1,2-Dichloroethene (tot
<0.02
<2.0
2.5
<2.0
<0.02
<2.0
5
<2.0
<0.02
<2.0
4.6
<2.0
<0.02
<2.0
3.4
<2.0
<50.0
805
<50.0
<40.0
812
<40.0
<40.0
720
<40.0
<40.0
652
<40.0
<40.0
592
<40.0

APPENDIX B

Flow Frequency Memo
Receiving Stream Data

Orrix Creek at Heptinstall's Grocery



MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
3019 Peters Creek Road **Roanoke, Virginia 24019**

SUBJECT: Flow Frequency Determination, Heptinstall Grocery
Reissuance of VPDES Permit No. VA0091502

TO: File

FROM: Lewis Pillis

DATE: November 17, 2008

The Heptinstall Grocery remediation system discharges to the headwaters of Orrix Creek near Mentow, VA. Since this permit was issued, the discharge has been piped to the main stem of the Creek and two additional drought years of flow data have been added to the gage analysis. Stream flow frequencies are recalculated from those used in the permit issuance in 2004. This results in a decreased flow in the perennial portion of Orrix Creek, but an increase in the flow for the discharge.

At the discharge point, the receiving stream is shown as a perennial stream on the USGS Huddleston Quadrangle topographic map. DEQ personnel have reported that there are a number of springs a short distance upstream of the discharge.

The VDEQ has operated continuous record gages on two water bodies in the area with different drainage areas. The Big Otter River near Evington, Va. (#2061500), located downstream of Orrix Creek in Campbell County and the other in Bedford Co. on Goose Creek near Huddleston, Va. (#02059500).

The flow frequencies for the gages and the perennial point are presented on the following page. The flows were determined by drainage area proportions and do not address any withdrawals, discharges, or springs lying between the gage and the perennial point. Flow frequencies to be used at the discharge point are averages of these two comparisons. The high flow months are January through May.

Reference Gauge (data from 1936-2003)
Big Otter River near Evington, Va. (#2061500)

Drainage Area [mi^2] = 320.0

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	18	11.6	High Flow 1Q10 =	85	54.9
7Q10 =	21	13.6	High Flow 7Q10 =	98	63.3
30Q5 =	48	31.0	HM =	132	85.3
30Q10 =	131	84.7			

By Drainage Area Comparison:
Orrix Creek at perennial point

Drainage Area [mi^2] = 0.49

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	0.027	0.018	High Flow 1Q10 =	0.130	0.084
7Q10 =	0.032	0.021	High Flow 7Q10 =	0.149	0.097
30Q5 =	0.073	0.047	HM =	0.201	0.130
30Q10 =	0.200	0.129			

Reference Gauge (data from 1930-2003)
Goose Creek near Huddleston, Va. (#02059500)

Drainage Area [mi^2] = 188.0

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	17	11.0	High Flow 1Q10 =	44	28.4
7Q10 =	20	12.9	High Flow 7Q10 =	52	33.6
30Q5 =	34	22.0	HM =	87	56.2
30Q10 =	27	17.4			

By Drainage Area Comparison:
Orrix Creek at perennial point

Drainage Area [mi^2] = 0.49

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	0.044	0.029	High Flow 1Q10 =	0.115	0.074
7Q10 =	0.052	0.034	High Flow 7Q10 =	0.136	0.088
30Q5 =	0.089	0.057	HM =	0.227	0.147
30Q10 =	0.070	0.045			

Orrix Creek at Discharge From Heptinstall Grocery Remediation System
Average of the two gage drainage area comparisons:

	MGD		MGD
1Q10 =	0.023	High Flow 1Q10 =	0.079
7Q10 =	0.027	High Flow 7Q10 =	0.092
30Q5 =	0.052	HM =	0.138
30Q10 =	0.087		

Water Quality Parameters Detected
Station ID 4AORR002.63
Orrix Creek, downstream of Rt. 713 Bridge
Waterbody ID = VAW-L27R

Parm code	Name	Collection Date	Value	Comment Code
WATER				
410	ALKALINITY, TOTAL (MG/L AS CACO3)	4/6/2004	20.4	
915	CALCIUM, DISSOLVED (MG/L AS CA)	4/6/2004	3.4	
1106	ALUMINUM, DISSOLVED (UG/L AS AL)	4/6/2004	12.92	
1000	ARSENIC, DISSOLVED (UG/L AS AS)	4/6/2004	0.15	
CHLCM2	BENTHIC CHLOROPHYLL A, MG/M2	8/30/2004	25.7	
CHLCM2	BENTHIC CHLOROPHYLL A, MG/M2	8/30/2004	31.75	
CHLCM2	BENTHIC CHLOROPHYLL A, MG/M2	8/30/2004	33.19	
1030	CHROMIUM, DISSOLVED (UG/L AS CR)	4/6/2004	0.2	
1040	COPPER, DISSOLVED (UG/L AS CU)	4/6/2004	0.26	
31648	E. COLI - MTEC-MF N0/100ML	4/6/2004	10	
46570	HARDNESS, CA MG CALCULATED (MG/L AS CACO3)	4/6/2004	14	
1046	IRON, DISSOLVED (UG/L AS FE)	4/6/2004	420	
925	MAGNESIUM, DISSOLVED (MG/L AS MG)	4/6/2004	1.4	
1056	MANGANESE, DISSOLVED (UG/L AS MN)	4/6/2004	23	
1065	NICKEL, DISSOLVED (UG/L AS NI)	4/6/2004	0.28	
620	NITRATE NITROGEN, TOTAL (MG/L AS N)	4/6/2004	0.08	
620	NITRATE NITROGEN, TOTAL (MG/L AS N)	8/30/2004	0.27	
625	NITROGEN, KJELDAHL, TOTAL, (MG/L AS N)	4/6/2004	0.1	
600	NITROGEN, TOTAL (MG/L AS N)	4/6/2004	0.28	
665	PHOSPHORUS, TOTAL (MG/L AS P)	4/6/2004	0.02	
665	PHOSPHORUS, TOTAL (MG/L AS P)	8/30/2004	0.04	
70507	PHOSPHORUS,IN TOTAL ORTHOPHOSPHATE (MG/L AS P)	8/30/2004	0.02	
500	RESIDUE, TOTAL (MG/L)	4/6/2004	49	
510	RESIDUE, TOTAL FIXED (MG/L)	4/6/2004	38	
505	RESIDUE, TOTAL VOLATILE (MG/L)	4/6/2004	11	
70300	RESIDUE,TOTAL FILTRABLE (DRIED AT 180C),MG/L	4/6/2004	44	
82079	TURBIDITY,LAB NEPHELOMETRIC TURBIDITY UNITS, NTU	4/6/2004	3.8	
SEDIMENT				
34599	DI-N-OCTYL PHTHALATE DRY WGTBOTUG/KG	4/6/2004	91	CMS
1108	ALUMINUM IN BOTTOM DEPOSITS (MG/KG AS AL DRY WGT)	4/6/2004	3800	
687	CARBON, ORGANIC, IN BED MATERIAL (GM/KG AS C)	4/6/2004	5.46	
1029	CHROMIUM,TOTAL IN BOTTOM DEPOSITS (MG/KG,DRY WGT)	4/6/2004	21.7	
1170	IRON IN BOTTOM DEPOSITS (MG/KG AS FE DRY WGT)	4/6/2004	8500	
1053	MANGANESE IN BOTTOM DEPOSITS (MG/KG AS MN DRY WGT)	4/6/2004	329	
82007	PERCENT SAND IN SEDIMENT ON A DRY WEIGHT BASIS	4/6/2004	80	
82008	SEDIMENT PRCTL.SIZE CLASS .0039-.0625 SILT %DRY WT	4/6/2004	11	
82009	SEDIMENT PRCTL.SIZE CLASS <.0039 CLAY %DRY WT	4/6/2004	10	
95	SPECIFIC CONDUCTANCE (UMHOS/CM @ 25C)	4/6/2004	52.6	
1093	ZINC IN BOTTOM DEPOSITS (MG/KG AS ZN DRY WGT)	4/6/2004	27.1	

CMS = confirmed by mass spectrometer

APPENDIX C

Waste Load Allocation Spreadsheet
Water Quality Standards Data
STATS printouts

Mixing Zone Predictions for Heptinstall Grocery

Effluent Flow = 0.0016 MGD
Stream 7Q10 = 0.027 MGD
Stream 30Q10 = 0.087 MGD
Stream 1Q10 = 0.023 MGD
Stream slope = 0.004 ft/ft
Stream width = 10 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .0426 ft
Length = 1317.19 ft
Velocity = .1039 ft/sec
Residence Time = .1467 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .0842 ft
Length = 742.65 ft
Velocity = .1628 ft/sec
Residence Time = .0528 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0389 ft
Length = 1421.11 ft
Velocity = .0979 ft/sec
Residence Time = 4.0337 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 24.79% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Heptinstall Grocery GW Remediation Permit No.: VA0091502

Receiving Stream: Orrix Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temperature (Annual) =	21.8 deg C
90% Temperature (Wet season) =	21.8 deg C
90% Maximum pH =	7.47 SU
10% Maximum pH =	7.47 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	y
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	0.023 MGD
7Q10 (Annual) =	0.027 MGD
30Q10 (Annual) =	0.087 MGD
1Q10 (Wet season) =	0.079 MGD
30Q10 (Wet season)	0.092 MGD
30Q5 =	0.052 MGD
Harmonic Mean =	0.14 MGD
Annual Average =	0.15 MGD

Mixing Information

Annual - 1Q10 Mix =	24.79 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	22.26 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temp (Annual) =	21.8 deg C
90% Temp (Wet season) =	21.8 deg C
90% Maximum pH =	8.85 SU
10% Maximum pH =	7 SU
Discharge Flow =	0.0016 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	1.2E+03	2.7E+03	--	--	4.0E+04	9.0E+04	--	--	1.2E+02	2.7E+02	--	--	4.0E+03	9.0E+03	--	--	**4.0E+03**	**9.0E+03**
Acrolein	0	--	--	3.2E+02	7.8E+02	--	--	1.1E+04	2.6E+04	--	--	3.2E+01	7.8E+01	--	--	1.1E+03	2.6E+03	--	--	**1.1E+03**	**2.6E+03**
Acrylonitrile [C]	0	--	--	5.9E-01	6.6E+00	--	--	5.2E+01	5.8E+02	--	--	5.9E-02	6.6E-01	--	--	5.2E+00	5.8E+01	--	--	**5.2E+00**	**5.8E+01**
Aldrin [C]	0	3.0E+00	--	1.3E-03	1.4E-03	1.4E+01	--	1.2E-01	1.2E-01	7.5E-01	--	1.3E-04	1.4E-04	1.2E+01	--	1.2E-02	1.2E-02	**1.2E+01**	--	**1.2E-02**	**1.2E-02**
Ammonia-N (mg/l) (Yearly)	0	1.78E+01	2.78E+00	--	--	8.1E+01	1.5E+02	--	--	4.99E+00	6.96E-01	--	--	7.7E+01	3.9E+01	--	--	**7.7E+01**	**3.9E+01**	--	--
Ammonia-N (mg/l) (High Flow)	0	1.97E+01	2.78E+00	--	--	2.4E+02	1.6E+02	--	--	5.14E+00	6.96E-01	--	--	2.6E+02	4.1E+01	--	--	**2.4E+02**	**4.1E+01**	--	--
Anthracene	0	--	--	9.6E+03	1.1E+05	--	--	3.2E+05	3.7E+06	--	--	9.6E+02	1.1E+04	--	--	3.2E+04	3.7E+05	--	--	**3.2E+04**	**3.7E+05**
Antimony	0	--	--	1.4E+01	4.3E+03	--	--	4.7E+02	1.4E+05	--	--	1.4E+00	4.3E+02	--	--	4.7E+01	1.4E+04	--	--	**4.7E+01**	**1.4E+04**
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	1.6E+03	2.7E+03	3.4E+02	--	8.5E+01	3.8E+01	1.0E+00	--	1.3E+03	6.7E+02	3.4E+01	--	**1.3E+03**	**6.7E+02**	**3.4E+01**	--
Barium	0	--	--	2.0E+03	--	--	--	6.7E+04	--	--	--	2.0E+02	--	--	--	6.7E+03	--	--	--	**6.7E+03**	--
Benzene [C]	0	--	--	1.2E+01	7.1E+02	--	--	1.1E+03	6.3E+04	--	--	1.2E+00	7.1E+01	--	--	1.1E+02	6.3E+03	--	--	**1.1E+02**	**6.3E+03**
Benzidine [C]	0	--	--	1.2E-03	5.4E-03	--	--	1.1E-01	4.8E-01	--	--	1.2E-04	5.4E-04	--	--	1.1E-02	4.8E-02	--	--	**1.1E-02**	**4.8E-02**
Benzo (a) anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	**3.9E-01**	**4.3E+00**
Benzo (b) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	**3.9E-01**	**4.3E+00**
Benzo (k) fluoranthene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	**3.9E-01**	**4.3E+00**
Benzo (a) pyrene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	**3.9E-01**	**4.3E+00**
Bis2-Chloroethyl Ether	0	--	--	3.1E-01	1.4E+01	--	--	1.0E+01	4.7E+02	--	--	3.1E-02	1.4E+00	--	--	1.0E+00	4.7E+01	--	--	**1.0E+00**	**4.7E+01**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	1.7E+05	--	--	4.7E+04	5.7E+06	--	--	1.4E+02	1.7E+04	--	--	4.7E+03	5.7E+05	--	--	**4.7E+03**	**5.7E+05**
Bromoform [C]	0	--	--	4.4E+01	3.6E+03	--	--	3.9E+03	3.2E+05	--	--	4.4E+00	3.6E+02	--	--	3.9E+02	3.2E+04	--	--	**3.9E+02**	**3.2E+04**
Butylbenzylphthalate	0	--	--	3.0E+03	5.2E+03	--	--	1.0E+05	1.7E+05	--	--	3.0E+02	5.2E+02	--	--	1.0E+04	1.7E+04	--	--	**1.0E+04**	**1.7E+04**
Cadmium	0	8.2E-01	3.8E-01	5.0E+00	--	3.7E+00	6.8E+00	1.7E+02	--	2.1E-01	9.5E-02	5.0E-01	--	3.2E+00	1.7E+00	1.7E+01	--	**3.2E+00**	**1.7E+00**	**1.7E+01**	--
Carbon Tetrachloride [C]	0	--	--	2.5E+00	4.4E+01	--	--	2.2E+02	3.9E+03	--	--	2.5E-01	4.4E+00	--	--	2.2E+01	3.9E+02	--	--	**2.2E+01**	**3.9E+02**
Chlordane [C]	0	2.4E+00	4.3E-03	2.1E-02	2.2E-02	1.1E+01	7.7E-02	1.9E+00	1.9E+00	6.0E-01	1.1E-03	2.1E-03	2.2E-03	9.2E+00	1.9E-02	1.9E-01	1.9E-01	**9.2E+00**	**1.9E-02**	**1.9E-01**	**1.9E-01**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	3.9E+06	4.1E+06	8.4E+06	--	2.2E+05	5.8E+04	2.5E+04	--	3.3E+06	1.0E+06	8.4E+05	--	**3.3E+06**	**1.0E+06**	**8.4E+05**	--
TRC	0	1.9E+01	1.1E+01	--	--	8.7E+01	2.0E+02	--	--	4.8E+00	2.8E+00	--	--	7.3E+01	4.9E+01	--	--	**7.3E+01**	**4.9E+01**	--	--
Chlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	2.3E+04	7.0E+05	--	--	6.8E+01	2.1E+03	--	--	2.3E+03	7.0E+04	--	--	**2.3E+03**	**7.0E+04**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[E]	0	--	--	4.1E+00	3.4E+02	--	--	3.6E+02	3.0E+04	--	--	4.1E-01	3.4E+01	--	--	3.6E+01	3.0E+03	--	--	3.6E+01	3.0E+03
Chloroform [C]	0	--	--	3.5E+02	2.9E+04	--	--	3.1E+04	2.6E+06	--	--	3.5E+01	2.9E+03	--	--	3.1E+03	2.6E+05	--	--	3.1E+03	2.6E+05
2-Chloronaphthalene	0	--	--	1.7E+03	4.3E+03	--	--	5.7E+04	1.4E+05	--	--	1.7E+02	4.3E+02	--	--	5.7E+03	1.4E+04	--	--	5.7E+03	1.4E+04
2-Chlorophenol	0	--	--	1.2E+02	4.0E+02	--	--	4.0E+03	1.3E+04	--	--	1.2E+01	4.0E+01	--	--	4.0E+02	1.3E+03	--	--	4.0E+02	1.3E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	3.8E-01	7.3E-01	--	--	2.1E-02	1.0E-02	--	--	3.2E-01	1.8E-01	--	--	3.2E-01	1.8E-01	--	--
Chromium III	0	1.8E+02	2.4E+01	--	--	8.4E+02	4.3E+02	--	--	4.6E+01	6.0E+00	--	--	7.0E+02	1.1E+02	--	--	7.0E+02	1.1E+02	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	7.3E+01	2.0E+02	--	--	4.0E+00	2.8E+00	--	--	6.2E+01	4.9E+01	--	--	6.2E+01	4.9E+01	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	3.4E+03	--	--	--	1.0E+01	--	--	--	3.4E+02	--	--	--	3.4E+02	--
Chrysene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	3.9E-01	4.3E+00
Copper	0	3.6E+00	2.7E+00	1.3E+03	--	1.7E+01	4.9E+01	4.4E+04	--	9.1E-01	6.8E-01	1.3E+02	--	1.4E+01	1.2E+01	4.4E+03	--	1.4E+01	1.2E+01	4.4E+03	--
Cyanide	0	2.2E+01	5.2E+00	7.0E+02	2.2E+05	1.0E+02	9.3E+01	2.3E+04	7.2E+06	5.5E+00	1.3E+00	7.0E+01	2.2E+04	8.5E+01	2.3E+01	2.3E+03	7.2E+05	8.5E+01	2.3E+01	2.3E+03	7.2E+05
DDD [C]	0	--	--	8.3E-03	8.4E-03	--	--	7.3E-01	7.4E-01	--	--	8.3E-04	8.4E-04	--	--	7.3E-02	7.4E-02	--	--	7.3E-02	7.4E-02
DDE [C]	0	--	--	5.9E-03	5.9E-03	--	--	5.2E-01	5.2E-01	--	--	5.9E-04	5.9E-04	--	--	5.2E-02	5.2E-02	--	--	5.2E-02	5.2E-02
DDT [C]	0	1.1E+00	1.0E-03	5.9E-03	5.9E-03	5.0E+00	1.8E-02	5.2E-01	5.2E-01	2.8E-01	2.5E-04	5.9E-04	5.9E-04	4.2E+00	4.5E-03	5.2E-02	5.2E-02	4.2E+00	4.5E-03	5.2E-02	5.2E-02
Demeton	0	--	1.0E-01	--	--	--	1.8E+00	--	--	--	2.5E-02	--	--	--	4.5E-01	--	--	--	4.5E-01	--	--
Dibenz(a,h)anthracene [C]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	3.9E-01	4.3E+00
Dibutyl phthalate	0	--	--	2.7E+03	1.2E+04	--	--	9.0E+04	4.0E+05	--	--	2.7E+02	1.2E+03	--	--	9.0E+03	4.0E+04	--	--	9.0E+03	4.0E+04
Dichloromethane (Methylene Chloride) [C]	0	--	--	4.7E+01	1.6E+04	--	--	4.2E+03	1.4E+06	--	--	4.7E+00	1.6E+03	--	--	4.2E+02	1.4E+05	--	--	4.2E+02	1.4E+05
1,2-Dichlorobenzene	0	--	--	2.7E+03	1.7E+04	--	--	9.0E+04	5.7E+05	--	--	2.7E+02	1.7E+03	--	--	9.0E+03	5.7E+04	--	--	9.0E+03	5.7E+04
1,3-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.3E+04	8.7E+04	--	--	4.0E+01	2.6E+02	--	--	1.3E+03	8.7E+03	--	--	1.3E+03	8.7E+03
1,4-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	1.3E+04	8.7E+04	--	--	4.0E+01	2.6E+02	--	--	1.3E+03	8.7E+03	--	--	1.3E+03	8.7E+03
3,3-Dichlorobenzidine[E]	0	--	--	4.0E-01	7.7E-01	--	--	3.5E+01	6.8E+01	--	--	4.0E-02	7.7E-02	--	--	3.5E+00	6.8E+00	--	--	3.5E+00	6.8E+00
Dichlorobromomethane [C]	0	--	--	5.6E+00	4.6E+02	--	--	5.0E+02	4.1E+04	--	--	5.6E-01	4.6E+01	--	--	5.0E+01	4.1E+03	--	--	5.0E+01	4.1E+03
1,2-Dichloroethane [C]	0	--	--	3.8E+00	9.9E+02	--	--	3.4E+02	8.8E+04	--	--	3.8E-01	9.9E+01	--	--	3.4E+01	8.8E+03	--	--	3.4E+01	8.8E+03
1,1-Dichloroethylene	0	--	--	3.1E+02	1.7E+04	--	--	1.0E+04	5.7E+05	--	--	3.1E+01	1.7E+03	--	--	1.0E+03	5.7E+04	--	--	1.0E+03	5.7E+04
1,2-trans-dichloroethylene	0	--	--	7.0E+02	1.4E+05	--	--	2.3E+04	4.7E+06	--	--	7.0E+01	1.4E+04	--	--	2.3E+03	4.7E+05	--	--	2.3E+03	4.7E+05
2,4-Dichlorophenol	0	--	--	9.3E+01	7.9E+02	--	--	3.1E+03	2.6E+04	--	--	9.3E+00	7.9E+01	--	--	3.1E+02	2.6E+03	--	--	3.1E+02	2.6E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	3.4E+03	--	--	--	1.0E+01	--	--	--	3.4E+02	--	--	--	3.4E+02	--
1,2-Dichloropropane[E]	0	--	--	5.2E+00	3.9E+02	--	--	4.6E+02	3.5E+04	--	--	5.2E-01	3.9E+01	--	--	4.6E+01	3.5E+03	--	--	4.6E+01	3.5E+03
1,3-Dichloropropene	0	--	--	1.0E+01	1.7E+03	--	--	3.4E+02	5.7E+04	--	--	1.0E+00	1.7E+02	--	--	3.4E+01	5.7E+03	--	--	3.4E+01	5.7E+03
Dieldrin [C]	0	2.4E-01	5.6E-02	1.4E-03	1.4E-03	1.1E+00	1.0E+00	1.2E-01	1.2E-01	6.0E-02	1.4E-02	1.4E-04	1.4E-04	9.2E-01	2.5E-01	1.2E-02	1.2E-02	9.2E-01	2.5E-01	1.2E-02	1.2E-02
Diethyl Phthalate	0	--	--	2.3E+04	1.2E+05	--	--	7.7E+05	4.0E+06	--	--	2.3E+03	1.2E+04	--	--	7.7E+04	4.0E+05	--	--	7.7E+04	4.0E+05
Di-2-Ethylhexyl Phthalate [C]	0	--	--	1.8E+01	5.9E+01	--	--	1.6E+03	5.2E+03	--	--	1.8E+00	5.9E+00	--	--	1.6E+02	5.2E+02	--	--	1.6E+02	5.2E+02
2,4-Dimethylphenol	0	--	--	5.4E+02	2.3E+03	--	--	1.8E+04	7.7E+04	--	--	5.4E+01	2.3E+02	--	--	1.8E+03	7.7E+03	--	--	1.8E+03	7.7E+03
Dimethyl Phthalate	0	--	--	3.1E+05	2.9E+06	--	--	1.0E+07	9.7E+07	--	--	3.1E+04	2.9E+05	--	--	1.0E+06	9.7E+06	--	--	1.0E+06	9.7E+06
Di-n-Butyl Phthalate	0	--	--	2.7E+03	1.2E+04	--	--	9.0E+04	4.0E+05	--	--	2.7E+02	1.2E+03	--	--	9.0E+03	4.0E+04	--	--	9.0E+03	4.0E+04
2,4 Dinitrophenol	0	--	--	7.0E+01	1.4E+04	--	--	2.3E+03	4.7E+05	--	--	7.0E+00	1.4E+03	--	--	2.3E+02	4.7E+04	--	--	2.3E+02	4.7E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	7.65E+02	--	--	4.5E+02	2.6E+04	--	--	1.3E+00	7.7E+01	--	--	4.5E+01	2.6E+03	--	--	4.5E+01	2.6E+03
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	9.1E+01	--	--	9.7E+01	8.1E+03	--	--	1.1E-01	9.1E+00	--	--	9.7E+00	8.1E+02	--	--	9.7E+00	8.1E+02
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	1.2E-06	--	--	1.1E-04	1.1E-04	--	--	1.2E-07	1.2E-07	--	--	1.1E-05	1.1E-05	--	--	1.1E-05	1.1E-05
1,2-Diphenylhydrazine[E]	0	--	--	4.0E-01	5.4E+00	--	--	3.5E+01	4.8E+02	--	--	4.0E-02	5.4E-01	--	--	3.5E+00	4.8E+01	--	--	3.5E+00	4.8E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	1.0E+00	1.0E+00	3.7E+03	8.0E+03	5.5E-02	1.4E-02	1.1E+01	2.4E+01	8.5E-01	2.5E-01	3.7E+02	8.0E+02	8.5E-01	2.5E-01	3.7E+02	8.0E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	1.0E+00	1.0E+00	3.7E+03	8.0E+03	5.5E-02	1.4E-02	1.1E+01	2.4E+01	8.5E-01	2.5E-01	3.7E+02	8.0E+02	8.5E-01	2.5E-01	3.7E+02	8.0E+02
Endosulfan Sulfate	0	--	--	1.1E+02	2.4E+02	--	--	3.7E+03	8.0E+03	--	--	1.1E+01	2.4E+01	--	--	3.7E+02	8.0E+02	--	--	3.7E+02	8.0E+02
Endrin	0	8.6E-02	3.6E-02	7.6E-01	8.1E-01	3.9E-01	6.4E-01	2.5E+01	2.7E+01	2.2E-02	9.0E-03	7.6E-02	8.1E-02	3.3E-01	1.6E-01	2.5E+00	2.7E+00	3.3E-01	1.6E-01	2.5E+00	2.7E+00
Endrin Aldehyde	0	--	--	7.6E-01	8.1E-01	--	--	2.5E+01	2.7E+01	--	--	7.6E-02	8.1E-02	--	--	2.5E+00	2.7E+00	--	--	2.5E+00	2.7E+00

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	3.1E+03	2.9E+04	--	--	1.0E+05	9.7E+05	--	--	3.1E+02	2.9E+03	--	--	1.0E+04	9.7E+04	--	--	**1.0E+04**	**9.7E+04**
Fluoranthene	0	--	--	3.0E+02	3.7E+02	--	--	1.0E+04	1.2E+04	--	--	3.0E+01	3.7E+01	--	--	1.0E+03	1.2E+03	--	--	**1.0E+03**	**1.2E+03**
Fluorene	0	--	--	1.3E+03	1.4E+04	--	--	4.4E+04	4.7E+05	--	--	1.3E+02	1.4E+03	--	--	4.4E+03	4.7E+04	--	--	**4.4E+03**	**4.7E+04**
Foaming Agents	0	--	--	5.0E+02	--	--	--	1.7E+04	--	--	--	5.0E+01	--	--	--	1.7E+03	--	--	--	**1.7E+03**	**--**
Guthion	0	--	1.0E-02	--	--	--	1.8E-01	--	--	--	2.5E-03	--	--	--	4.5E-02	--	--	--	4.5E-02	**--**	**--**
Heptachlor [c]	0	5.2E-01	3.8E-03	2.1E-03	2.1E-03	2.4E+00	6.8E-02	1.9E-01	1.9E-01	1.3E-01	9.5E-04	2.1E-04	2.1E-04	2.0E+00	1.7E-02	1.9E-02	1.9E-02	**2.0E+00**	**1.7E-02**	**1.9E-02**	**1.9E-02**
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	1.0E-03	1.1E-03	2.4E+00	6.8E-02	8.9E-02	9.7E-02	1.3E-01	9.5E-04	1.0E-04	1.1E-04	2.0E+00	1.7E-02	8.9E-03	9.7E-03	**2.0E+00**	**1.7E-02**	**8.9E-03**	**9.7E-03**
Hexachlorobenzene[c]	0	--	--	7.5E-03	7.7E-03	--	--	6.6E-01	6.8E-01	--	--	7.5E-04	7.7E-04	--	--	6.6E-02	6.8E-02	--	--	**6.6E-02**	**6.8E-02**
Hexachlorobutadiene[c]	0	--	--	4.4E+00	5.0E+02	--	--	3.9E+02	4.4E+04	--	--	4.4E-01	5.0E+01	--	--	3.9E+01	4.4E+03	--	--	**3.9E+01**	**4.4E+03**
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	3.9E-02	1.3E-01	--	--	3.5E+00	1.2E+01	--	--	3.9E-03	1.3E-02	--	--	3.5E-01	1.2E+00	--	--	**3.5E-01**	**1.2E+00**
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	1.4E-01	4.6E-01	--	--	1.2E+01	4.1E+01	--	--	1.4E-02	4.6E-02	--	--	1.2E+00	4.1E+00	--	--	**1.2E+00**	**4.1E+00**
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	--	1.9E-01	6.3E-01	4.3E+00	--	1.7E+01	5.6E+01	2.4E-01	--	1.9E-02	6.3E-02	3.7E+00	--	1.7E+00	5.6E+00	**3.7E+00**	**--**	**1.7E+00**	**5.6E+00**
Hexachlorocyclopentadiene	0	--	--	2.4E+02	1.7E+04	--	--	8.0E+03	5.7E+05	--	--	2.4E+01	1.7E+03	--	--	8.0E+02	5.7E+04	--	--	**8.0E+02**	**5.7E+04**
Hexachloroethane[c]	0	--	--	1.9E+01	8.9E+01	--	--	1.7E+03	7.9E+03	--	--	1.9E+00	8.9E+00	--	--	1.7E+02	7.9E+02	--	--	**1.7E+02**	**7.9E+02**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	3.6E+01	--	--	--	5.0E-01	--	--	--	8.9E+00	--	--	--	**8.9E+00**	**--**	**--**
Indeno (1,2,3-cd) pyrene [c]	0	--	--	4.4E-02	4.9E-01	--	--	3.9E+00	4.3E+01	--	--	4.4E-03	4.9E-02	--	--	3.9E-01	4.3E+00	--	--	**3.9E-01**	**4.3E+00**
Iron	0	--	--	3.0E+02	--	--	--	1.0E+04	--	--	--	3.0E+01	--	--	--	1.0E+03	--	--	--	**1.0E+03**	**--**
Isophorone[c]	0	--	--	3.6E+02	2.6E+04	--	--	3.2E+04	2.3E+06	--	--	3.6E+01	2.6E+03	--	--	3.2E+03	2.3E+05	--	--	**3.2E+03**	**2.3E+05**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	**0.0E+00**	**--**	**--**
Lead	0	2.0E+01	2.3E+00	1.5E+01	--	9.3E+01	4.1E+01	5.0E+02	--	5.1E+00	5.8E-01	1.5E+00	--	7.8E+01	1.0E+01	5.0E+01	--	**7.8E+01**	**1.0E+01**	**5.0E+01**	**--**
Malathion	0	--	1.0E-01	--	--	--	1.8E+00	--	--	--	2.5E-02	--	--	--	4.5E-01	--	--	--	**4.5E-01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	1.7E+03	--	--	--	5.0E+00	--	--	--	1.7E+02	--	--	--	**1.7E+02**	**--**
Mercury	0	1.4E+00	7.7E-01	5.0E-02	5.1E-02	6.4E+00	1.4E+01	1.7E+00	1.7E+00	3.5E-01	1.9E-01	5.0E-03	5.1E-03	5.4E+00	3.4E+00	1.7E-01	1.7E-01	**5.4E+00**	**3.4E+00**	**1.7E-01**	**1.7E-01**
Methyl Bromide	0	--	--	4.8E+01	4.0E+03	--	--	1.6E+03	1.3E+05	--	--	4.8E+00	4.0E+02	--	--	1.6E+02	1.3E+04	--	--	**1.6E+02**	**1.3E+04**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	5.4E-01	3.4E+03	--	--	7.5E-03	1.0E+01	--	--	1.3E-01	3.4E+02	--	--	**1.3E-01**	**3.4E+02**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	**0.0E+00**	**--**	**--**
Monochlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	2.3E+04	7.0E+05	--	--	6.8E+01	2.1E+03	--	--	2.3E+03	7.0E+04	--	--	**2.3E+03**	**7.0E+04**
Nickel	0	5.6E+01	6.3E+00	6.1E+02	4.6E+03	2.6E+02	1.1E+02	2.0E+04	1.5E+05	1.4E+01	1.6E+00	6.1E+01	4.6E+02	2.2E+02	2.8E+01	2.0E+03	1.5E+04	**2.2E+02**	**2.8E+01**	**2.0E+03**	**1.5E+04**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	3.4E+05	--	--	--	1.0E+03	--	--	--	3.4E+04	--	--	--	**3.4E+04**	**--**
Nitrobenzene	0	--	--	1.7E+01	1.9E+03	--	--	5.7E+02	6.4E+04	--	--	1.7E+00	1.9E+02	--	--	5.7E+01	6.4E+03	--	--	**5.7E+01**	**6.4E+03**
N-Nitrosodimethylamine[c]	0	--	--	6.9E-03	8.1E+01	--	--	6.1E-01	7.2E+03	--	--	6.9E-04	8.1E+00	--	--	6.1E-02	7.2E+02	--	--	**6.1E-02**	**7.2E+02**
N-Nitrosodiphenylamine[c]	0	--	--	5.0E+01	1.6E+02	--	--	4.4E+03	1.4E+04	--	--	5.0E+00	1.6E+01	--	--	4.4E+02	1.4E+03	--	--	**4.4E+02**	**1.4E+03**
N-Nitrosodi-n-propylamine[c]	0	--	--	5.0E-02	1.4E+01	--	--	4.4E+00	1.2E+03	--	--	5.0E-03	1.4E+00	--	--	4.4E-01	1.2E+02	--	--	**4.4E-01**	**1.2E+02**
Parathion	0	6.5E-02	1.3E-02	--	--	3.0E-01	2.3E-01	--	--	1.6E-02	3.3E-03	--	--	2.5E-01	5.8E-02	--	--	**2.5E-01**	**5.8E-02**	**--**	**--**
PCB-1016	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1221	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1232	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1242	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1248	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1254	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB-1260	0	--	1.4E-02	--	--	--	2.5E-01	--	--	--	3.5E-03	--	--	--	6.3E-02	--	--	--	**6.3E-02**	**--**	**--**
PCB Total[c]	0	--	--	1.7E-03	1.7E-03	--	--	1.5E-01	1.5E-01	--	--	1.7E-04	1.7E-04	--	--	1.5E-02	1.5E-02	--	--	**1.5E-02**	**1.5E-02**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol [C]	0	1.2E+01	1.0E+01	2.8E+00	8.2E+01	5.5E+01	1.8E+02	2.5E+02	7.3E+03	3.3E+00	2.6E+00	2.8E-01	8.2E+00	5.1E+01	4.6E+01	2.5E+01	7.3E+02	5.1E+01	4.6E+01	2.5E+01	7.3E+02
Phenol	0	--	--	2.1E+04	4.6E+06	--	--	7.0E+05	1.5E+08	--	--	2.1E+03	4.6E+05	--	--	7.0E+04	1.5E+07	--	--	7.0E+04	1.5E+07
Pyrene	0	--	--	9.6E+02	1.1E+04	--	--	3.2E+04	3.7E+05	--	--	9.6E+01	1.1E+03	--	--	3.2E+03	3.7E+04	--	--	3.2E+03	3.7E+04
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity	0	--	--	1.5E+01	1.5E+01	--	--	5.0E+02	5.0E+02	--	--	1.5E+00	1.5E+00	--	--	5.0E+01	5.0E+01	--	--	5.0E+01	5.0E+01
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	1.3E+02	1.3E+02	--	--	4.0E-01	4.0E-01	--	--	1.3E+01	1.3E+01	--	--	1.3E+01	1.3E+01
Strontium-90	0	--	--	8.0E+00	8.0E+00	--	--	2.7E+02	2.7E+02	--	--	8.0E-01	8.0E-01	--	--	2.7E+01	2.7E+01	--	--	2.7E+01	2.7E+01
Tritium	0	--	--	2.0E+04	2.0E+04	--	--	6.7E+05	6.7E+05	--	--	2.0E+03	2.0E+03	--	--	6.7E+04	6.7E+04	--	--	6.7E+04	6.7E+04
Selenium	0	2.0E+01	5.0E+00	1.7E+02	1.1E+04	9.1E+01	8.9E+01	5.7E+03	3.7E+05	5.0E+00	1.3E+00	1.7E+01	1.1E+03	7.7E+01	2.2E+01	5.7E+02	3.7E+04	7.7E+01	2.2E+01	5.7E+02	3.7E+04
Silver	0	3.2E-01	--	--	--	1.5E+00	--	--	--	7.9E-02	--	--	--	1.2E+00	--	--	--	1.2E+00	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	8.4E+06	--	--	--	2.5E+04	--	--	--	8.4E+05	--	--	--	8.4E+05	--
1,1,2,2-Tetrachloroethane [C]	0	--	--	1.7E+00	1.1E+02	--	--	1.5E+02	9.7E+03	--	--	1.7E-01	1.1E+01	--	--	1.5E+01	9.7E+02	--	--	1.5E+01	9.7E+02
Tetrachloroethylene [C]	0	--	--	8.0E+00	8.9E+01	--	--	7.1E+02	7.9E+03	--	--	8.0E-01	8.9E+00	--	--	7.1E+01	7.9E+02	--	--	7.1E+01	7.9E+02
Thallium	0	--	--	1.7E+00	6.3E+00	--	--	5.7E+01	2.1E+02	--	--	1.7E-01	6.3E-01	--	--	5.7E+00	2.1E+01	--	--	5.7E+00	2.1E+01
Toluene	0	--	--	6.8E+03	2.0E+05	--	--	2.3E+05	6.7E+06	--	--	6.8E+02	2.0E+04	--	--	2.3E+04	6.7E+05	--	--	2.3E+04	6.7E+05
Total dissolved solids	0	--	--	5.0E+05	--	--	--	1.7E+07	--	--	--	5.0E+04	--	--	--	1.7E+06	--	--	--	1.7E+06	--
Toxaphene [C]	0	7.3E-01	2.0E-04	7.3E-03	7.5E-03	3.3E+00	3.6E-03	6.5E-01	6.6E-01	1.8E-01	5.0E-05	7.3E-04	7.5E-04	2.8E+00	8.9E-04	6.5E-02	6.6E-02	2.8E+00	8.9E-04	6.5E-02	6.6E-02
Tributyltin	0	4.6E-01	6.3E-02	--	--	2.1E+00	1.1E+00	--	--	1.2E-01	1.6E-02	--	--	1.8E+00	2.8E-01	--	--	1.8E+00	2.8E-01	--	--
1,2,4-Trichlorobenzene	0	--	--	2.6E+02	9.4E+02	--	--	8.7E+03	3.1E+04	--	--	2.6E+01	9.4E+01	--	--	8.7E+02	3.1E+03	--	--	8.7E+02	3.1E+03
1,1,2-Trichloroethane [C]	0	--	--	6.0E+00	4.2E+02	--	--	5.3E+02	3.7E+04	--	--	6.0E-01	4.2E+01	--	--	5.3E+01	3.7E+03	--	--	5.3E+01	3.7E+03
Trichloroethylene [C]	0	--	--	2.7E+01	8.1E+02	--	--	2.4E+03	7.2E+04	--	--	2.7E+00	8.1E+01	--	--	2.4E+02	7.2E+03	--	--	2.4E+02	7.2E+03
2,4,6-Trichlorophenol [C]	0	--	--	2.1E+01	6.5E+01	--	--	1.9E+03	5.8E+03	--	--	2.1E+00	6.5E+00	--	--	1.9E+02	5.8E+02	--	--	1.9E+02	5.8E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	1.7E+03	--	--	--	5.0E+00	--	--	--	1.7E+02	--	--	--	1.7E+02	--
Vinyl Chloride [C]	0	--	--	2.3E-01	6.1E+01	--	--	2.0E+01	5.4E+03	--	--	2.3E-02	6.1E+00	--	--	2.0E+00	5.4E+02	--	--	2.0E+00	5.4E+02
Zinc	0	3.6E+01	3.6E+01	9.1E+03	6.9E+04	1.7E+02	6.5E+02	3.0E+05	2.3E+06	9.1E+00	9.1E+00	9.1E+02	6.9E+03	1.4E+02	1.6E+02	3.0E+04	2.3E+05	1.4E+02	1.6E+02	3.0E+04	2.3E+05

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	4.7E+01
Arsenic	3.4E+01
Barium	6.7E+03
Cadmium	1.0E+00
Chromium III	6.4E+01
Chromium VI	2.5E+01
Copper	5.6E+00
Iron	1.0E+03
Lead	6.2E+00
Manganese	1.7E+02
Mercury	1.7E-01
Nickel	1.7E+01
Selenium	1.3E+01
Silver	4.9E-01
Zinc	5.6E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

WLA Analysis For: Heptinstall's Grocery **Date:** 02/05/09

Stream: UT Orrix Creek

Mean Hardness =	25	mg/L (Default)
Stream NH3 =	0	mg/L
90% Temperature =	21	C
90% pH =	7.47	SU
Fractional 7Q10 =	0.027	MGD (100%)
Fractional 1Q10 =	0.0057017	MGD (24.79%)
Harmonic mean =	0.14	Carcinogen
30Q5 Flow =	0.052	Non-carcinogen
Annual Average =	0.2	Dioxin only
R(iver),L(ake) or S(torm):	R	R, L, S
Trout Present?	n	Y, N
Public Water Supply:	Y	Y, N

Effluent Information

Mean Hardness =	25	mg/L
Effluent NH3 =	0	mg/L
90% Temperature =	21	C
90% pH =	7.47	SU
Original Flow =	0.0016	MGD

Hardness

acute:	25
chronic:	25
7Q10 Ratio:	17.875
1Q10 Ratio:	4.5635625
Harmonic ratio:	88.5
30Q5 ratio:	33.5
Annual Average ratio:	126

Mix Hardness

acute:	25
chronic:	25
* WLAa	
Coefficient =	0.43825411
Acute IWC =	0.21912705
Chronic IWC =	0.05594406

Parameter and Form	Carcinogen?	Sort? (Y/N)	Aquatic Protection Freshwater Criteria Acute Criteria	Chronic Criteria	Human Health Criteria PWS Criteria	Other Waters Criteria	Acute WLA	Chronic WLA	PWS WLA	Other Waters WLA
1,2-Dichloroethane (1,2 DCA)	n	y	11800	1180	3.8	990	53850.04	21092.50	127.30	33165.00
Benzene	C	y	530	53	12	710	2418.69	947.38	1062.0	62835.0
Ethylbenzene	n	y	3200	320	3100	29000	14603.40	5720.00	103850	971500
Ethylene dibromide EDB	C	y	1500	150	0.169	5.3	6845.34	2681.25	14.96	469.05
MTBE	n	y	18400	1840	15	20	83969.55	32890.00	502.50	670.00
Toluene	n	y	1750	175	6800	200000	7986.23	3128.13	227800	6700000
Xylenes, total	n	y	330	33	None	None	1505.98	589.88	NA	NA

2/5/2009 10:53:07 AM

Facility = Heptinstall Grocery
Chemical = Toluene
Chronic averaging period = 4
WLAa = 6700
WLAc = 780
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 2100
Variance = 1587600
C.V. = 0.6
97th percentile daily values = 5110.17
97th percentile 4 day average = 3493.95
97th percentile 30 day average= 2532.71
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1140.80833156152
Average Weekly limit = 1140.80833156152
Average Monthly LImit = 1140.80833156152

The data are:

2100

2/5/2009 10:58:24 AM

Facility = Heptinstall Grocery
Chemical = Ethylbenzene
Chronic averaging period = 4
WLAa = 13000
WLAc = 1400
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 2047.60469767452
Average Weekly limit = 2047.60469767452
Average Monthly LImit = 2047.60469767452

The data are:

1000

2/5/2009 10:59:57 AM

Facility = Heptinstall Grocery
Chemical = Xylenes
Chronic averaging period = 4
WLAa = 1300
WLAc = 150
Q.L. = 10
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 4440
Variance = 7096896
C.V. = 0.6
97th percentile daily values = 10804.3
97th percentile 4 day average = 7387.22
97th percentile 30 day average= 5354.87
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 219.386217607985
Average Weekly limit = 219.386217607985
Average Monthly LImit = 219.386217607985

The data are:

4440

11/19/2008 10:56:25 AM

Facility = Heptinstall Grocery
Chemical = Total lead
Chronic averaging period = 4
WLAa = 78
WLAc = 10
Q.L. = 2.3
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 142
Variance = 7259.04
C.V. = 0.6
97th percentile daily values = 345.545
97th percentile 4 day average = 236.258
97th percentile 30 day average= 171.259
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 14.6257478405323
Average Weekly limit = 14.6257478405323
Average Monthly LImit = 14.6257478405323

The data are:

142